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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/665,767	09/20/2000	James Claude Carnahan	RD-27,100	8695

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EXAMINER

CYGAN, MICHAEL T

ART UNIT	PAPER NUMBER
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2855

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/665,767

Applicant(s)

CARNAHAN ET AL.

Examiner

Michael Cygan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2003 and 19 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-8,10-21,23-29,31,34-36 and 38-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-8,10-21,23-29,31,34-36 and 38-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☒ Interview Summary (PTO-413) Paper No(s) 29.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 24 January 2003 has been entered.

Claim Objections

2. Claims 1, 4-8, 10-21, 23-29, 31, 34-36, and 38-43 are objected to because of the following informalities: the claims recite a molar mass detector which is non-sequential with a column, concentration detector, and waste reservoir; however, as shown in Figure 2, the flow path through the molar mass detector [17] is the following: column [13], concentration detector [15], molar mass detector [17], waste reservoir [19]. The molar mass detector therefore is still in the same sequence, and the claim language should not contradict the disclosed design and operation. Appropriate correction is required. This objection could be overcome by replacing language concerning "sequential" flow with language detailing "split" flow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4-8, 10, 11, 18, 19, 21, 23, 24, 26-29, and 31, 34, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miroslav (US 6,296,771 B1) in view of Allcock ("Contemporary Polymer Chemistry", 1990) and in view of Connelly (US 5,938,932). Miroslav discloses an analysis system and method for polymer weight determination which comprises injecting a known amount of sample into an analysis system containing a GPC (size-exclusive; see column 1, lines 48-49; column 14, lines 52-64; column 18, lines 47-48) column, an in-line concentration detector and a molar mass detector (such as a differential refractive index detector and a light scattering detector, see column 20, lines 26-39); wherein a high molecular weight fraction is separated with minimal dispersion from monomer components (column 21, line 62 through column 22, line 3), analyzed to determine concentration and molar mass, and an average molecular weight derived therefrom (column 21, lines 1-22; average molecular weights are inherently calculated from concentration

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and molecular mass). The average molecular weight may be number-averaged or weight averaged; see column 21, lines 4-16. The total analysis time may be 60 seconds (column 12, lines 33-36). A plurality of samples are provided from a sample preparation array (Figure 5) and analysis is conducted automatically with an autoinjector (column 12, lines 1-25), a solvent preparation and delivery system (Figure 3 and description at columns 7-11, particularly column 7, lines 47-49), a chromatographic column [102], detectors [103] (such as a differential refractive index detector and a light scattering detector, see column 20, lines 26-39), and a computer [222]. Miroslav discloses serial (sequential) detection at column 20, lines 23-39 and column 21, lines 37-61. Flow can be diverted to a detector (see Figure 7 and column 20, lines 5-25). See entire document.

Miroslav teaches the claimed invention except for the sample being the product of a polymer reaction between a diphenyl carbonate and a dihydric phenol, and for an off-line molar mass detector not in a column-concentration detector-waste flow path.

With respect to the sample being the product of a polymer reaction between a diphenyl carbonate and a dihydric phenol, Miroslav teaches only that the disclosed invention is "for characterizing combinatorial libraries of material samples such as polymer samples, and particularly, libraries of or derived from reaction mixtures such as polymerization product mixtures, to facilitate the discovery of commercially important

materials". Allcock teaches that polycarbonates "of particular importance" are formed by reaction of bisphenol A (a dihydric phenol with the chemical formula of 2,2-bis(4-hydroxyphenyl)propane) and diphenyl carbonate, (and inherently, an appropriate solvent) see page 29. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a product of a polymer reaction between a diphenyl carbonate and a dihydric phenol as taught by Allcock in the invention of Miroslav as a sample for analysis in order to provide advantageous use of the invention of Miroslav, since Allcock teaches that such a product is "of particular importance", and Miroslav states that his invention is to be used with polymerization reaction product mixtures having commercial importance.

With respect to a molar mass detector not in the column-concentration detector-waste flow path, Connelly teaches the use of a molar mass detector [510] not in a column [502]- concentration detector [516]-waste (output of [512]) flow path; see Figure 5, column 7 lines 50-64, and column 8 line 56 through column 9 line 59. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a split analysis path as taught by Connelly in the invention taught by Miroslav to send only the desired amount of sample flow to the molar mass detector, since Connelly teaches that such splitting is advantageous

for substantially contemporaneous, high-throughput detection (column 2, lines 58-60).

With respect to claims 6-8, Miroslav discloses the sample containing a solvent chosen from a group comprising "typical solvents" such as tetrahydrofuran or toluene.

With respect to claims reciting offline techniques, while Miroslav discloses online techniques, the examiner takes Official Notice of the equivalence of offline and online techniques in the analysis art, and the use of either of these techniques would have been obvious to one having ordinary skill in the art at the time the invention was made. A reference is cited in the "Response to Arguments" section below in support of the Official Notice.

4. Claims 12-17, 20, 25, and 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miroslav (US 6,296,771 B1) in view of Allcock ("Contemporary Polymer Chemistry", 1990) and in view of Connelly (US 5,938,932), further in view of Nielsen (US 6,175,409 B1). With respect to claims 12-17, 25 and 38-43, the claims are considered to be met by Miroslav in view of Allcock except for an analysis time less than 40, 30, 20, 10, 5, or 3 seconds. With respect to the analysis time, Nielsen discloses the total analysis time for the above-disclosed system (showing minimal dispersion; see Figure 8) and method to be "not more than 1 second per sample" for determining average molecular weight if desired;

see column 23 through column 24; see also columns 40-41. Since Miroslav is directed toward the same system and method of Nielsen, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the time structure of Nielsen in the invention of Miroslav to achieve the speed of analysis as disclosed by Nielsen since this would result in a rapid analysis capable of a high sample throughput. Note that the inventions of Miroslav and Nielsen both derive priority from the same invention disclosed in a provisional application (60/157,338).

With respect to claim 20, Miroslav discloses a dynamic (i.e., operating at multiple angles) light scattering detector (column 20, lines 26-32), but does not disclose a step of utilizing multiple angles for detection. Nielsen discloses that multiple angles can be used for light scattering measurements, see Figure 8. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use multiple angles for detection as taught by Nielsen in the invention of Miroslav, since detection at multiple angles with a dynamic light scattering detector provides more information as to the nature of the sample resulting in a more accurate analysis. Note that the inventions of Miroslav and Nielsen both derive priority from the same invention disclosed in a provisional application (60/157,338).

Respons to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

5. With respect to applicant's traversal of the examiner's use of Official Notice of the equivalence of offline and online techniques in the art, U. S. Patent Number 5,854,084 (Drukier) is cited in support of the Official Notice in accordance with MPEP 2144.03. At column 14, lines 3-6, Drukier states that there are "three main modalities for analytical use of HPLC columns, The detection is done either inflight, or is done after the effluent is caught in a fraction collector"; further, at lines 36-38, Drukier supplies motivation for selection of either technique as an alternative, stating that the "relative merits of on-line and off-line monitoring of the chromatographic process may be evaluated in terms of cost and throughput".

Conclusion

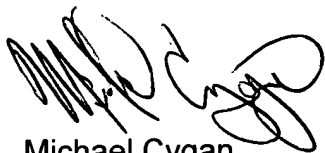
6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Afeyan (US 6,344,172 B1) and Abedi (US 6,413,431 B1) disclose chromatography systems having detectors in split flow paths.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cygan whose telephone number is 703-305-0846. The examiner can normally be reached on 8:30-6 M-Th, alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on 703-305-4816. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A handwritten signature in black ink, appearing to read 'Michael Cygan', with a stylized flourish at the end.

Michael Cygan
April 4, 2003